Meeting Summary
Red Hill Bulk Fuel Storage Facility
Administrative Order on Consent (AOC) Statement of Work (SOW)
Red Hill Subject Matter Expert Meeting, May 10 – 12, 2016, Honolulu, Hawaii
Hawaii Department of Health
919 Ala Moana Blvd, 5th Floor, Honolulu, HI

May 10, 2016 10:00-15:00

1) Introductions were given from each of the organizations in attendance to discuss the Red Hill Bulk Fuel Storage Facility (Red Hill): The Navy; Defense Logistics Agency (DLA); U.S. Environmental Protection Agency Region IX (EPA); State of Hawaii Department of Health Soil and Hazardous Waste Branch (DOH); Honolulu Board of Water Supply (BWS); U.S. Geological Survey (USGS); and the State of Hawaii Department of Land and Natural Resources (DLNR). There were also consultants present hired by BWS, DOH and the Navy. This day's discussions are primarily for Sections 6 and 7, Investigation and Remediation of Releases and Ground Water Protection and Evaluation.
2) The meeting was held to ensure there is a clear understanding of the thoughts and concerns of subject matter experts; however, it was clearly stated and understood that no decisions would be made during the meeting.
3) Recently passed by the State of Hawaii Legislature bill HB2646 HD2 SD2 CD1 creates a Red Hill Facility Advisory Committee to advise the State.
4) EPA and DOH (herein referred to as the "Regulatory Agencies") will make final decisions and approve actions.

Navy remarks:

5) The Navy submitted a Monitoring Well Installation Work Plan in April 2016 and requested comments from the Regulatory Agencies by May 25, 2016 to expedite field activities for drilling and installing the on-base wells currently targeted to begin in July 2016.
6) Two off-base monitoring wells require extended real estate processes to acquire real estate access rights agreements from the various land owners. One off-base well location requires review and approval from the City and County of Honolulu, and the second off-base well location requires a different real estate process as it is privately owned. The Navy will keep the parties informed of the real estate process

as it progresses. The Navy stated that any support from the parties to help expedite any part of the process will be appreciated.

7) The Navy stated monitoring well permits submitted for the on-base locations will be submitted to the DLNR for review and approval before the end of the month (May 2016).

8) The Navy requested assistance from the DLNR and DOH to timely approve monitoring well and noise permits to help expedite the field work for drilling and installing the on-base monitoring wells.

9) The Navy inquired about any potential plans the BWS may have for future water supply wells proposed by BWS in the vicinity of the Red Hill Facility (i.e., Moanalua area).
   a. The BWS responded that there are no specific plans at this time for use of nearby areas as a new drinking water resource. BWS further stated the process to explore a potential drinking water resource for development takes between five to seven years.
   b. It was agreed upon by the parties that the Navy and DLA will submit a formal letter of request for information (e.g., well construction logs, water quality data, pumping rates and schedules, potential new well locations, etc.) directly to the BWS with attention to Mr. Ernie Lau and copy the Regulatory Agencies.

BWS remarks and questions with Navy responses:

10) The BWS is concerned that there is uncertainty regarding the presence or absence of valley fill between Red Hill and Halawa Shaft.
   a. The Navy commented that there are several references of previous studies suggesting the presence of valley fill in the area.

11) The BWS is concerned that the groundwater flow is questionable and undefined and additional monitoring wells are needed to characterize groundwater flow.
   a. The Navy responded that it has recently installed two monitoring wells and four additional wells are planned to be installed during 2016-2017.

12) The BWS is especially concerned about groundwater flow from the Red Hill towards the Halawa Shaft. The Navy indicated that existing wells and four new proposed wells should help confirm if there is a groundwater flow component towards Halawa Shaft.
   a. The Navy stated the proposed monitoring wells are expected to assist in determining whether valley fill intersects the groundwater aquifer and in addressing potential pathways to groundwater along the eastern, southern,

and western boundaries of the Red Hill Facility (that currently do not have monitoring wells) to better define groundwater flow directions.

b. The Navy further noted that this investigation takes a phased approach, and as results are received, data will be evaluated at that time to determine the next steps.

13) The BWS, USGS, Navy, and DLA agreed to collaborate during aquifer testing. The data obtained will be provided by the Navy to the Regulatory Agencies. EPA will subsequently post the data on its website. It was noted that the approximate proposed well locations have already been determined. The Navy has been working expeditiously toward completing field activities and analyzing limitations on where the wells can be located due to various factors (e.g., topography, and property use and ownership).

14) The BWS stated that elevated water use occurs during summer and the months immediately following summer (e.g., September and October) and suggested that those months may not be optimal for aquifer testing (e.g., pump tests).

15) The Navy plans to resurvey all monitoring wells using established benchmarks. The USGS suggested that the topographic survey should be a conducted as a first-order survey.

16) The BWS indicated plans to install a monitoring well close to Navy monitoring well, RHMW09, and suggested that the Navy relocate RHMW09 to a location northeast of the Red Hill Facility to investigate potential groundwater flow in that direction. BWS also mentioned that recent efforts to contract the well installation were unsuccessful.

17) The Navy questioned whether groundwater flow in that direction was likely and stated that the four agreed-upon monitoring well locations should be prioritized. No decision on this suggestion was made during the meeting.

18) BWS inquired about the possibility of collecting split groundwater samples from the Navy monitoring wells to test for chemicals of potential concern (COPCs) that are not on the latest target COPC list.

a. EPA responded that the intent was to focus efforts on COPCs from constituents of fuel stored at the Red Hill Facility. The Navy stated that the current list of COPCs was derived based upon 15+ years of groundwater data from previous environmental investigations and the long-term groundwater monitoring program, DOH Technical Guidance Manual of recommended analytes, and constituents of the fuel actually stored at Red Hill in the last 15 years (JP-5, JP-8, and marine diesel). No decision was made on splitting samples.

19) It was noted that the work plan addresses the current investigation to address requirements of the AOC and therefore consists of only eight quarterly sampling events; However, additional events would continue under the long-term monitoring program.
20) The BWS recommended that any additives present in fuel stored at the Red Hill Facility should be included as COPCs.
    a. The Navy and DLA responded that they will provide to the Regulatory Agencies a list of and further information on additive compounds used in fuels stored at the Red Hill Facility.
21) The BWS suggested evaluating the breakdown products of fuel and the valence states of compounds that may result from the degradation process.
22) The BWS questioned why the COPC list had been reduced.
    a. The Navy noted that the current COPC list is appropriate because it is based on fuel types that have been stored at Red Hill, previous environmental investigations, historical sampling results, and regulatory guidance (DOH Technical Guidance Manual for middle distillates). Additional information for the basis of the COPC list can be found in the Work Plan/Scope of Work.
23) The BWS suggested that more evaluations of the vadose zone are necessary as infiltrating rainfall from above Red Hill may move the LNAPL (light non-aqueous phase liquid) to groundwater. The BWS requested more vapor monitoring points and noted that vapor monitoring points may be able to indicate the presence of LNAPL.
24) The Navy stated that due to the highly heterogeneous nature of the vadose zone underlying the Red Hill Facility, soil vapor readings may not provide actionable data or necessarily indicate reliable locations of LNAPL if present.
25) EPA responded that the concern and focus is with LNAPL present at the groundwater table, as it very difficult to characterize the vadose zone around Red Hill due to the highly heterogeneous nature of the vadose zone underlying the Red Hill Facility and other site limitations. It is on this basis that the Parties of the AOC currently plan to take a more conservative approach of modeling with the assumption of hypothetical amounts of LNAPL already present on the groundwater table interface versus modeling a less conservative scenario that considers the unpredictable, heterogeneous nature of the vadose zone.
26) The Navy noted that, due to the heterogeneity and anisotropic nature of the hydrogeology, use average values of hydraulic properties in a vadose zone model would not be representative of site conditions and would not be reproducible.

DLNR remarks:

27) The DLNR requested that future monitoring well borings that may encounter LNAPL (if present) in the vadose zone be considered for conversion to extraction points rather than abandoned.

USGS remarks:

28) The USGS commented that the modeling should acknowledge the variability in the groundwater flow evaluations. The Navy should consider that specified heads on the boundaries of the model can overestimate recharge, and a no-flow boundary on the model can underestimate salt water intrusion.

29) There was question on the utility of monitoring well, RHMW07.
    a. The Navy stated that RHMW07 provides valuable information input for the overall conceptual site model for the Red Hill Facility (i.e., may be screened within a very low permeability layer such as a dike complex) and will be included in the synoptic water level survey planned later in the investigation.

30) The USGS stated that other sources of uncertainty in the modeling would include the use of Type (1) prescribed head, Type (2) prescribed flux, or Type (3) head dependent flux boundaries. These uncertainties should be considered during the modeling effort. The USGS also suggested that the accuracy of the model could be improved if the limits of the model were extended to known geological boundaries.

EPA's remarks:

31) The EPA website will be set up to provide a notice when new information is uploaded.
32) In regards to the remedial alternatives, the EPA stated that even under the best circumstances, LNAPL recovery is typically only 10-20% of total product, so for a complicated site like Red Hill product recovery may not be practicable or worthwhile.
33) EPA requested that the Navy create a Gantt chart for the project schedule.